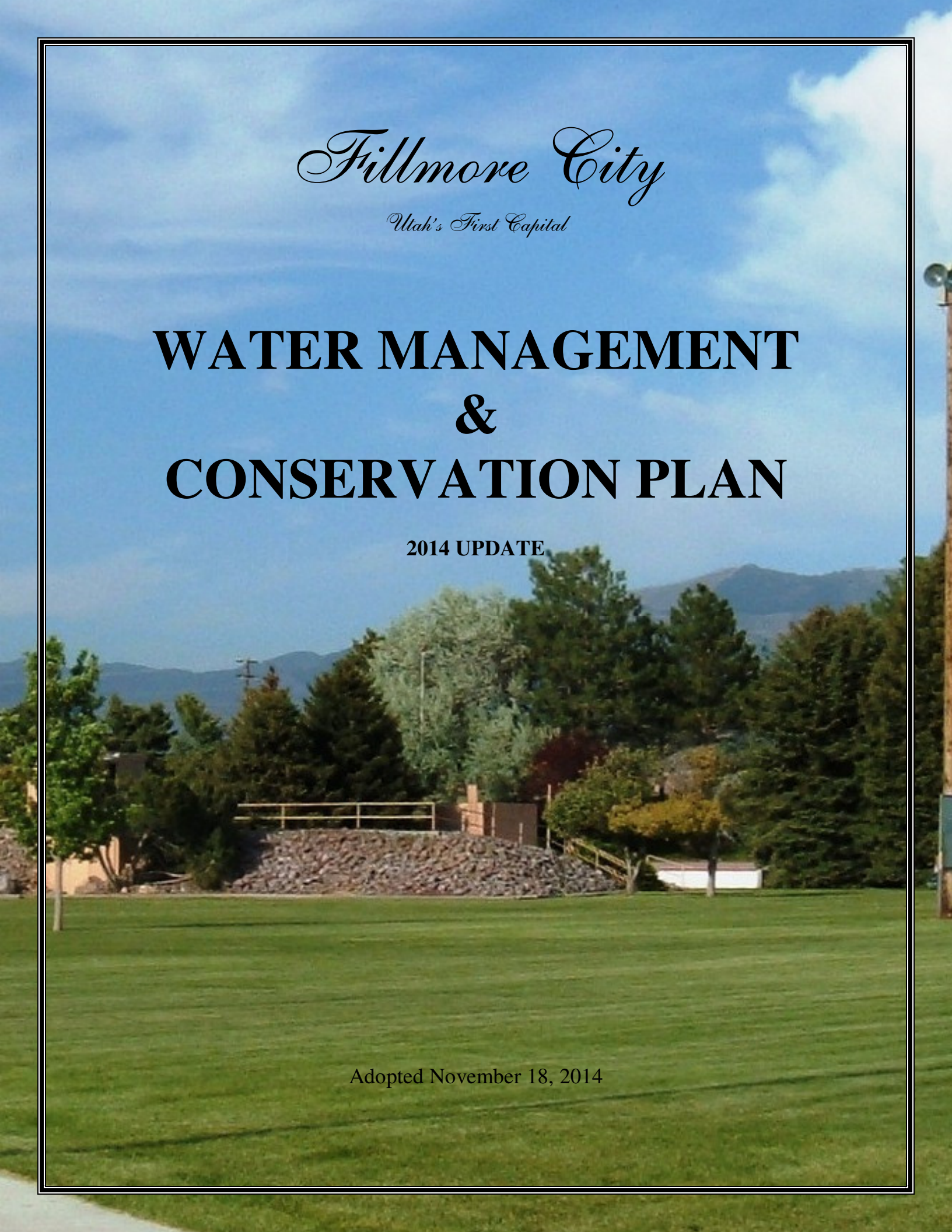


Fillmore City

Utah's First Capital

WATER MANAGEMENT & CONSERVATION PLAN

2014 UPDATE

Adopted November 18, 2014

FILLMORE CITY

WATER MANAGEMENT & CONSERVATION PLAN

November 18, 2014

Prepared by:

SUNRISE ENGINEERING, INC.

25 EAST 500 NORTH

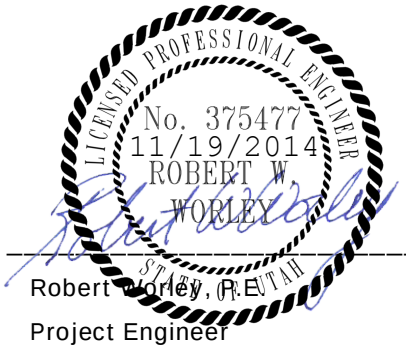
FILLMORE, UTAH 84631

435-743-6151

Project Team Leads:

ROBERT WORLEY, PE

Project Engineer



Robert Worley, P.E.

Project Engineer

Table of Contents

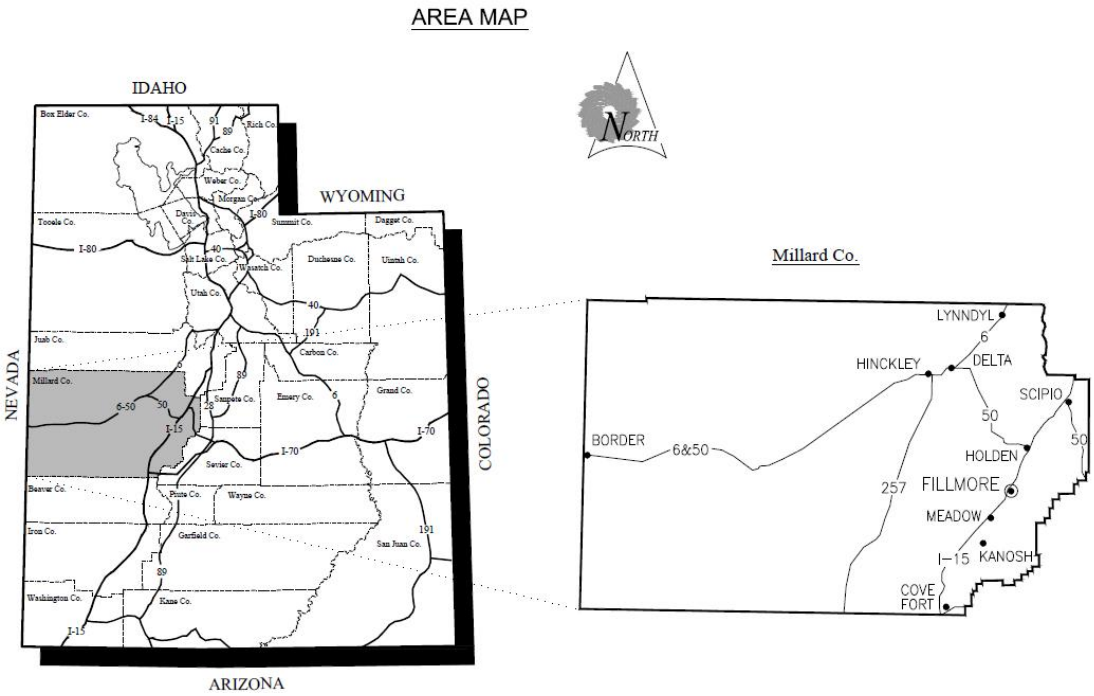
1.0 INTRODUCTION

In response to the continual growth that the State of Utah has seen statewide, Fillmore City has become increasingly aware of the future cost and availability of a finite supply of water. Similar concerns have been demonstrated by the state legislature as shown by the Water Conservation Plan Act (House Bill 71) passed and revised in the 2004 legislative session (Section 73-10-32 Utah Code Annotated). This document constitutes the Water Management and Conservation Plan for Fillmore City. It is intended to address the concerns of both Fillmore City and the State of Utah.

2.0 BACKGROUND INFORMATION

Fillmore City is a community in Millard County that is located on Interstate 15 in Central Utah. The Fillmore City culinary water system provides water to approximately 2,450 residents, in addition to numerous commercial, industrial and agricultural facilities. The culinary water system supplies water for both indoor and outdoor use, although a secondary water system is also available to most of the residences in Fillmore. In addition to residential growth, Fillmore City is also actively pursuing commercial and industrial growth that can provide economic benefit to the area. A map of the area is shown below in Figure 2.1:

Figure 2.1: Area Map



Fillmore City has commissioned Sunrise Engineering, Inc. to complete a water management and conservation plan in conjunction with the Fillmore City Culinary Water System Master Plan 2014. The intent of this plan is to implement better management practices and conservation efforts which will aid in maintaining and conserving their water resources for many years to come.

Fillmore City understands the critical nature of maintaining and conserving their water resources in order to meet the water needs of their customers. As a result, the protection and maintenance of the City's water sources and distribution system is a top priority that is critical to providing the continuous water supply that the customers depend on.

There is currently no formal Water Conservation Coordinator for the City. Fillmore City is a small community, and it would be an economic burden to have additional staff, therefore any conservation coordination will be accomplished by existing City Council members and the water system operator.

2.1 Culinary Water Connections

There are currently 1,078 connections on the system. This includes 896 residential connections, 126 commercial connections, 3 industrial connections, 6 agriculture, and 47 city/government connections.

3.0 EXISTING RESOURCES

3.1 Existing Water Rights

The existing Fillmore City water rights are listed in Table 3-1.

Table 3-1: Fillmore City Water Rights

Fillmore City Water Rights					
Water Right #	Description	Priority	Use Category	CFS	A-F
67-34	Well	1959	Irrigation to Municipal	2.76	824.93
67-205	Well	1954	Municipal	0.88	*637.10*
67-399	Well	1926	Irrigation	1.19	118.50
67-400	Well	1917	Irrigation	*0.20*	86.68
67-401	Well	1915	Irrigation	*0.27*	116.36
67-655	Well	1958	Irrigation to Municipal	1.13	388.80
67-671	Well	1959	Municipal	3.11	*2,251.54*
67-703	Well	1959	Irrigation	0.99	294.36
67-970	Spring	1923	Municipal	1.00	*723.98*
67-1149	Well	2010	Irrigation	1.50	*116.78*
67-1510	Surface*	1852	Municipal	0.99	*716.73*
67-1649	Well	2010	Irrigation	0.38	50.00
			Total:	14.41	6,325.76

*Quantity Varies based on actual surface flows. Quantity listed is based on full flow.
BOLD VALUES ARE POSTED ON UTAH DIVISION OF WATER RIGHTS WEBSITE
Italicized values are back calculated based on Utah Division of Water Rights Website values

It should be noted that Table 3-1 represents a cursory review of the water rights on record with the Utah Division of Water Rights. A more detailed water rights report was done in 2009 and can be referred to for more detail in regards to Fillmore City's water rights.

3.2 Existing Sources and Distribution Facilities

3.2.1 Fillmore City Sources

Fillmore City has five primary sources for the culinary water system. Two of the sources, Well #1 and Well #4 are not currently used. The remaining sources are used every year. Water Cress Spring has been a very reliable and steady source and is anticipated to remain that way. Well #2 is primarily used during the summer months, while Well #3 is primarily used during the winter months. Both wells are very reliable and produce high quality water.

Source	Capacity
Water Cress Spring	385 gpm
Well #1 (Airport)	0 gpm
Well #2	2400 gpm
Well #3	1200 gpm
Well #4 (Mattie)	0 gpm
Total	3985 gpm

The current source capacity for the Fillmore City culinary water system is therefore 3,985 gpm.

3.2.2 Existing Distribution System

Fillmore City's distribution system is comprised of 5 storage tanks and many miles of pipeline. The storage tanks are summarized below.

Table 3.2.2.1: Fillmore City Water Storage Tanks

Structure	Material	Capacity (Gal)
Cemetery Tank	Steel	200,000
Deer Pasture Tank 1	Concrete	175,000
Deer Pasture Tank 2	Concrete	1,000,000
Upper Tank 1	Concrete	500,000
Upper Tank 2	Concrete	500,000
Total Storage Capacity		2,375,000

The distribution system contains 5 pressure zones providing water pressure ranging from 45 – 120 psi. The distribution system has 4", 6", 8", 10", 12", 14" and 20" pipelines. Most of the pipeline is ductile iron pipe, however there are some areas that contain PVC pipe and some of the older 4" pipe is cast iron pipe with lead joints.

A full hydraulic analysis of the distribution system is contained in the 2014 Water Master Plan.

4.0 CURRENT AND FUTURE WATER USE

4.1 Projected Growth Rates

The 1970 Census population for Fillmore City was 1,411. The 2010 Census population estimate was 2,435. The average annual growth rate between the years 1970 and 2010 can be found by using the compound interest formula and solving for the growth rate, or "i". The compound interest formula is given as:

$$F = P * (1 + i)^n$$

Where: F = future population, P = present population, i = annual growth rate, and
n = number of years between P and F

Using F = 2435, P = 1411, n = 40, and solving for "i" gives an annual growth rate of 1.37%. However, the population projections from the Utah Governor's Office of Planning and Budget for Millard County over the next 20 years show an annual growth rate of only 0.22%. Fillmore City determined that the population projection that will be used for this plan will be 1.50%

Table 4.1: Projected Fillmore City Population

Year	Projected Population
2010 Census	2,435
2014	2,450
2024	2,843
2034	3,300

4.2 Equivalent Residential Connections (ERC's)

There are currently 1,078 connections on the system. This includes 896 residential connections, 126 commercial connections, 3 industrial connections, 6 agriculture, and 47 city/government connections.

In this plan, reference will be made to Equivalent Residential Connections (ERC's). One ERC is defined as the amount of culinary water required by an average residential connection. Because an ERC relates to the amount of water required for the average residential connection, use of this term allows commercial, industrial, or other large water users to be equated to a residential connection. ERC's are factored into calculations for impact fees, user rates, and other analyses as required for design purposes.

A review of all of the commercial and institutional connections currently on the system was performed to determine the equivalent ERC value to assign to each type of connection. Use of 400 gallons per day per connection or 12,000 gallons per month per connection was made the equivalent of one ERC. The measured use was based off of the average winter use per connection. Based on the records, the current system ERCs are:

Table 4.2: ERC Equivalents per Connection Category

Category	Connections	2 Year Total Usage (thousand gallons)	Average Monthly Usage per Conn	Winter Average Monthly Usage per Conn	Summer Average Monthly Usage per Conn	ERC/Conn	Total ERC
Residential	896	367,338	17,082	8,680	24,416	1	896
Commercial	126	126,107	41,702	30,370	50,021	3	378
Industrial	3	102,101	1,418,069	1,076,944	1,621,778	90	270
Agricultural	6	2,363	16,410	13,056	18,792	1	6
City	6	29,156	202,472	52,139	324,431	4	24
Gov't	41	143,194	145,522	79,400	208,366	7	287
Total	**1,078**	**770,259**					**1,861**

The number of culinary water ERC's expected at the end of the planning period can be calculated using the compound interest formula and inserting the projected growth rate, the existing number of culinary water ERC's, and the 20 year planning period for culinary water improvements.

The projected number of ERC's for the 20 year planning period is calculated using the compound interest formula as follows: $F = \text{Connections} \times (1 + \text{rate})^{20 \text{ years}}$ where F is the projected number of connections and the rate of growth is 1.50% per year for residential and commercial connections.

Table 4.3: Projected ERC's Category

Category	Current ERC's	20 Yr. ERC Projection
Residential	896	1,207
Commercial	378	509
Industrial	270	364
Agriculture	6	8
City	24	32
Government	287	387
	Total ERC's	**2,507**

4.3 Present Water Use and Future Water Needs

The actual billing summary for June 2012 to June 2014 showed that a total of 745,545,000 gallons were metered during this period. This equates to an average daily use of 1,021,000 gallons, or 550 gallons per ERC. The average daily per capita culinary water use is therefore 417 gpcd. It should be noted that approximately 30% of connections in Fillmore City use culinary water for outdoor watering. The remaining 70% of connections have access to the pressurized irrigation system, which is unmetered. Fillmore City's annual estimated usage (not including outdoor water provided by a private irrigation company) is summarized in Table 4.4.

Table 4.4: Annual Estimated Usage

	FILLMORE CITY CORPORATION MONTHLY WATER USAGE (PER THOUSAND GALLONS)							
Year	Month	Residential	Commercial	Industrial	Agricultural	City Owned	Government	Total
2012	June	41897	14359	4769	188	5103	27758	94,074
2012	July	11354	275	5327	0	0	0	16,956
2012	August	51577	20026	6390	192	8098	29189	115,472
2012	September	6299	384	5702	0	0	0	12,385
2012	October	29296	14281	4353	190	2639	16620	67,379
2012	November	1195	94	3913	0	0	0	5,202
2012	December	10157	6144	2568	27	28	2635	21,559
2013	January	38	0	3640	0	0	0	3,678
2013	February	2757	3468	2768	0	0	3831	12,824
2013	March	63	5	3276	0	0	0	3,344
2013	April	21388	6127	3371	207	16	1676	32,785
2013	May	6811	11	5523	0	0	0	12,345
2013	June	37313	11605	3289	274	3978	17024	73,483
2013	July	13675	0	6791	0	0	0	20,466
2013	August	45440	18497	3889	421	6111	24696	99,054
2013	September	6792	0	5763	0	0	0	12,555
2013	October	22803	11638	2454	314	1040	12187	50,436
2013	November	3232	69	4042	0	29	44	7,416
2013	December	2182	4836	1878	105	0	1316	10,317
2014	January	29	0	3946	0	0	0	3,975
2014	February	21528	5385	2178	304	18	2432	31,845
2014	March	50	0	3754	0	0	0	3,804
2014	April	13737	4319	2845	71	2	2173	23,147
2014	May	6239	29	4725	0	51	0	11,044
							2 Year Total	745,545
							Ave Daily Use	1,021
							Gal/ERC	0.55
							Gal/ Capita	0.42

As part of the Fillmore City Culinary Water Master Plan 2014, Sunrise Engineering calculated the current required amount of water rights for the Fillmore City water system based on the requirements stated in the Rules Governing Public Drinking Water Systems. The required water rights represent the average annual

demand on the system using the States recommended quantities for indoor use (400 gal/ERC/day) and outdoor use (1.87 ac-ft/irrigated acre). The calculated water right requirement is 1,288 ac-ft or approximately 420 Million gal/year. Fillmore City is using approximately 47 Million gallons less than the estimated average annual demand using the State's values for indoor and outdoor usage.

The projected number of ERC's at the end of the 20 year study period is 2,507. If the water usage per ERC remains the same at 550 gal/ERC/day, the total system water usage in 20 years will be 1,378,850 gal/day, or 503 Million gal/year. In comparison, the 20 year projected annual system water demand using the State's estimated values for indoor and outdoor water use would be 1,817 ac-ft, or 592 Million gal/year. That equals 88 Million gallons less than the estimated 20 year projected average annual demand using the State's values for indoor and outdoor usage.

4.4 Water Budget

Fillmore City's culinary water system is currently supplied from Water Cress Spring in conjunction with Well #2 and Well #3. Fillmore City's water rights related to culinary water from Water Cress Spring and the two wells total 5,609 ac-ft. As noted in Section 4.3, the total estimated annual water usage for the period of June 2012 to June 2014 was 745,545,000 gallons, which occurred over two years. This equates to 372,772,500 gal/yr. or 1,144 ac-ft/yr.

As calculated in the Fillmore City Culinary Water System Master Plan 2014, the 20 year projected required water right for Fillmore City is 1,817 ac-ft. This presents a 20 year surplus of 4,509 ac-ft based on Fillmore City's current water rights.

4.5 Culinary Water Rate Structure

Fillmore City's current culinary water rates are $22.50 per month for the first 5,000 gallons of water and $0.65 per 1,000 gallons for used of 5,000-20,000 gallons after that. Fees increase to $0.75 per 1,000 gallons for use of 20,000-100,000 gallons, and $1.00 per 1,000 gallons for any use greater than 100,000 gallons.

5.0 WATER CONCERNS, CONSERVATION GOALS AND SOLUTIONS

5.1 Concerns Identified

- The most pressing concern related to the culinary water system for Fillmore City is the inadequate fire flow fire protection in parts of the system
- Old 4" cast iron pipe in need of replacement
- Lost, broken, and too few valves.
- Cemetery Tank doesn't fully fill during the summer time

5.2 Conservation Goals and Solutions

Fillmore City's current average annual culinary water usage is 372,772,500 gallons, and the current population is approximately 2,450. The resulting per capita culinary water usage is therefore 417 gal/capita/day (gpcd). According to the presentation titled "Planning for Utah's Water Needs" dated December 10, 2013 and prepared by Todd Adams of the Utah Division of Water Resources, the statewide average per capita culinary water usage is 185 gpcd. Fillmore City's per capita culinary water usage is therefore 232 gpcd more than the state average usage. This higher amount can be partially attributed to the large amount of industrial and commercial water usage. Based upon the residential connections, the average person used 205 gpcd from the culinary system (367 Million gallons over a 2 year period for 2,450 people)

Fillmore City recognizes the importance of conserving its limited water resources, and acknowledges that the potentially rapid growth that may be experienced in the near future will place a higher demand on the water that is currently available. Fillmore City also recognizes that the State of Utah Division of Water Resources has established a goal to reduce per capita water usage in the state by 25% by the year 2025. Although significant progress has been made towards this goal, additional efforts are required to achieve it in the desired time frame. As such, Fillmore City will make efforts to reduce its residential per capita water usage by 10% over the next 10 years and 15% over the next 20 years. A 15% reduction in the per capita residential water usage in 20 years would equate to an annual water savings of 88.8 Million gallons/year, or 272 ac-ft/year compared to the current per capita water usage rate.

In order to meet this goal, Fillmore City will implement the following measures:

1. Monitor use patterns to detect leaks. Fillmore City will increase efforts in monitoring water meters on a regular basis. This will improve the chances of finding leaks as they occur. Fillmore is currently in the process of installing new water meters throughout the water system along with evaluating a reading system that reads the meters continually and is equipped with leak detection software.

2. Begin a public education program. Fillmore City will support state and local water education programs in local schools. It is expected that as time passes young adult citizens that have been continuously exposed to statewide "Slow the Flow" advertising during their youth will be more aware of the need to conserve water, and act accordingly. Fillmore City will also begin to send inexpensive periodic public education flyers to the general public. It is believed that if people are continuously exposed to water conservation messages, they will improve their water conservation habits.
3. Maintain a financially stable water system with conservation in mind. Continue to monitor and track the rates charged to ensure that the City's system is operated responsibly. As rate increases are required, overage tiers that penalize excessive use will be targeted first, rather than simple base rate increases.
4. Adopt resolutions that prohibit general waste of water and set time of day watering restrictions. General waste of water is any practice that allows the water to run in one place over an extended period of time. Use of culinary water for irrigation during the hottest parts of the day would be restricted during hours determined by the City Council.
5. Establish emergency water conservation contingency plans. The water conservation contingency plan for implementation due to severe drought or other system supply shortages is outlined in section 6.0 below
6. Encourage the use of high efficiency fixtures and watering. Fillmore City will encourage the installation of water efficient fixtures in homes and low water use landscaping in yards for both new construction and retrofit of existing structures. This, however, will not be required as the expense would be a hardship on individual households and the City could not afford to subsidize them.

5.3 Education Program Information

The following information on efficient outdoor and indoor water use will be disseminated periodically as a one-page conservation mailing (also included in Appendix A).

Efficient Outdoor Water Use:

- Water landscape only as much as required by the type of landscape, and the specific weather patterns of your area, including cutting back on watering times in the spring and fall.
- Do not water on hot, sunny, and/or windy days. You may actually end up doing more harm than good to your landscape, as well as wasting a significant amount of water.
- Sweep sidewalks and driveways instead of using the hose to clean them off.
- Wash your car from a bucket of soapy (biodegradable) water and rinse while parked on or near the grass or landscape so that all the water running off goes to beneficial use instead of running down the gutter to waste.

- Check for and repair leaks in all pipes, hoses, faucets, couplings, valves, etc. Verify there are no leaks by turning everything off and checking your water meter to see if it is still running. Some underground leaks may not be visible due to draining off into storm drains, ditches, or traveling outside your property.
- Use mulch around trees and shrubs, as well as in your garden to retain as much moisture as possible. Areas with drip systems will use much less water, particularly during hot, dry and windy conditions.
- Keep your lawn well-trimmed and all other landscaped areas free of weeds to reduce overall water needs of your yard.

Efficient Indoor Water Use:

- Approximately two-thirds of the total water used in a household is used in the bathroom. Concentrate on reducing your bathroom water use. Following are suggestions for this specific area:
    - Do not use your toilet as a wastebasket. Put all tissues, wrappers, diapers, cigarette butts, etc. in the trashcan.
    - Check the toilet for leaks. Is the water level too high? Put a few drops of food coloring in the tank. If the bowl water becomes colored without flushing, there is a leak.
    - If you do not have a low volume flush toilet, put a plastic bottle full of sand and water to reduce the amount of water used per flush. However, be careful not to over conserve to the point of having to flush twice to make the toilet work. Also, be sure the containers used do not interfere with the flushing mechanism.

6.0 CULINARY WATER CONSERVATION CONTINGENCY PLAN

The following water conservation contingency plan is adopted as part of this plan:

Level 1 – Normal Years – In this condition there is currently plenty of culinary water available for normal purposes.

- Encourage voluntary public water conservation measures (i.e. only watering during the cooler parts of the day).
- Mail information on conservation measures, which can be used outside as well as inside.

Level 2 - 75% of Normal Required Supply – In this condition, it is difficult to keep the water tanks full during the daylight hours if people are using culinary water for outdoor purposes.

- Educate the public about the water supply shortage and request cooperation using local public service radio announcements and local newspapers, and posted public flyers.

- Enact emergency rate increase to double all overage tiers.
- Enact mandatory public conservation measures.
- Enforce outside watering restrictions, including watering times and quantities.

Level 3 - 50% or Less of Normal Required Supply – In this condition, it is difficult to maintain tank levels during the full 24-hour day.

- Warn the public about water supply shortage and request continued cooperation using local newspapers advertisements, and posted public flyers.
- Enact emergency rate increase to quadruple all overage tiers.
- Strictly enforce all conservation policies with stiff fines for non-compliance.
- Physically restrict water supplies to (in order of priority):
    1. All outside irrigation systems.
    2. Parks and other non-essential support facilities.
    3. Commercial users, restricting the largest, non-animal life support users first.
    4. Residential areas
    5. Commercial animal life support users.
    6. Any other non-life support areas, insuring water supplies to hospitals, hospices, and all other health care facilities, and controlled designated area water facilities.

7.0 IMPLEMENTING AND UPDATING THE WATER CONSERVATION PLAN

This Water Management and Conservation Plan shall be adopted by the Fillmore City Council. The City Council will appoint a Water Conservation Coordinator, who shall have responsibility to coordinate the water conservation program goals for Fillmore City, and to coordinate and enhance the education program. All council members, City staff, and members of the general public have the duty and responsibility to report general waste of water, and to conserve water wherever possible.

This Water Management and Conservation Plan will be revised and updated as required to meet changing conditions and needs. The ordaining ordinance for the Water Conservation Plan is attached as Appendix B.

APPENDIX A:
WATER CONSERVATION MESSAGE

FILLMORE CITY WATER CONSERVATION MESSAGE

Efficient Outdoor Water Use:

- Water landscape only as much as required by the type of landscape, and the specific weather patterns of your area, including cutting back on watering times in the spring and fall.
- Do not water on hot, sunny, and/or windy days. You may actually end up doing more harm than good to your landscape, as well as wasting a significant amount of water.
- Sweep sidewalks and driveways instead of using the hose to clean them off.
- Wash your car from a bucket of soapy (biodegradable) water and rinse while parked on or near the grass or landscape so that all the water running off goes to beneficial use instead of running down the gutter to waste.
- Check for and repair leaks in all pipes, hoses, faucets, couplings, valves, etc. Verify there are no leaks by turning everything off and checking your water meter to see if it is still running. Some underground leaks may not be visible due to draining off into storm drains, ditches, or traveling outside your property.
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- Keep your lawn well-trimmed and all other landscaped areas free of weeds to reduce overall water needs of your yard.

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- Approximately two-thirds of the total water used in a household is used in the bathroom. Concentrate on reducing your bathroom water use. Following are suggestions for this specific area:
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    - If you do not have a low volume flush toilet, put a plastic bottle full of sand and water to reduce the amount of water used per flush. However, be careful not to over conserve to the point of having to flush twice to make the toilet work. Also, be sure the containers used do not interfere with the flushing mechanism.

APPENDIX B:

WATER CONSERVATION PLAN ORDINANCE

FILLMORE CITY RESOLUTION No. 14-08

A RESOLUTION OF THE CITY OF FILLMORE, UTAH TO UPDATE THE FILLMORE CITY WATER MANAGEMENT AND CONSERVATION PLAN DATED APRIL 1999

RECITALS

WHEREAS water conservation is a major concern; and,

WHEREAS water users need to be educated on the importance of conserving water; and,

WHEREAS Fillmore City must be prepared for water management when growth occurs and in times of emergency; and,

WHEREAS the Water Conservation Plan Act (UC 73-10-32) requires the Water Management and Conservation Plan to be updated every five years; and,

WHEREAS The 1999 Fillmore City Water Management and Conservation Plan was last updated December 1, 2009.

NOW THEREFORE, be it resolved by the city council of the City of Fillmore, Utah:

Section 1. Adoption. The Fillmore City Water Management and Conservation Plan 2014 Update is hereby adopted.

Section 2. Effective Date. This resolution shall become effective upon passage.

Section 3. Severability. To the extent that any resolutions or policies of Fillmore City conflict with the provisions of this resolution, they are hereby amended to be in accordance with the provisions hereof.

APPROVED AND PASSED this 18th day of November, 2014.

Eugene R. Larsen, Mayor

ATTEST:

Marlene Cummings, CMC
City Recorder

[seal]

VOTE:

Michael D. Holt	✓ Yea	___ Nay	___ Absent
Michael R. Rhinehart	✓ Yea	___ Nay	___ Absent
Eric R. Jenson	✓ Yea	___ Nay	___ Absent
Deborah W. Oeppinger	✓ Yea	___ Nay	___ Absent
N. Wayne Jackson	✓ Yea	___ Nay	___ Absent